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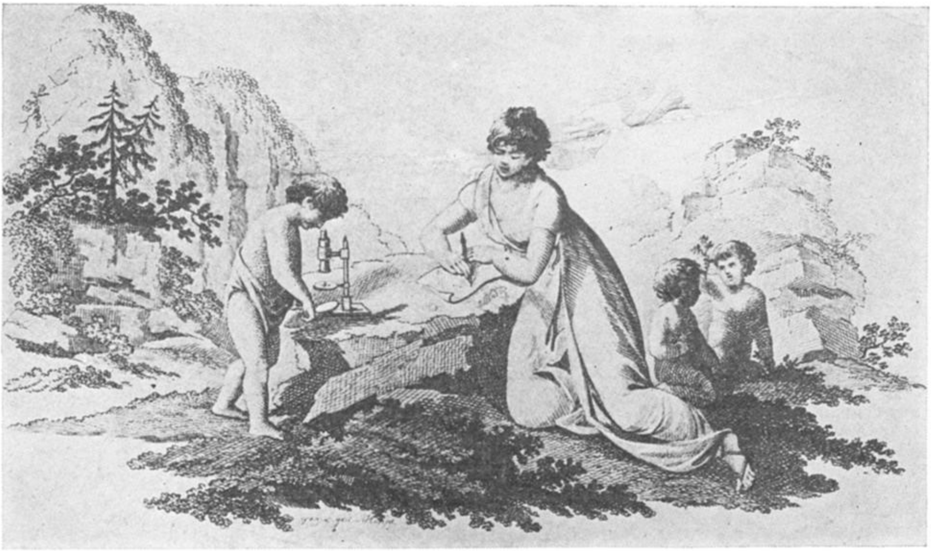
NOTES ON FISSIDENS

I. Difficulties in Determining the Oldest Species

Elizabeth G. Britton



The cut given above is taken from the title-page of Hedwig's *Species Muscorum*, published after his death, by Schwaegrichen at Leipzig in 1801. Several interesting facts may be noted, first that it is a simple microscope, second that the object appears to be dry, without slide or cover glass, and furthermore the plant was evidently not much dissected. These limitations, will explain why even "*the father of bryology*" may have occasionally included more than one species under one name! But, when we remember "Gray's Botanist's Microscope" as advertised in the back of Gray's *Manual* as late as 1878 and our first compound microscope, with two or three tiny objectives, and recall the blurry uncertain images that resulted therefrom, we cannot help wondering at the artistic skill and accuracy of many of the old plates published in the last part of the 18th and the early part of the 19th centuries.

The principle of the compound microscope was discovered as early as 1590 but no great improvement was made in it for over two centuries. All the earlier English and French microscopes in the Cox collection, at the New York Botanical Garden, showing the history of the development of the microscope, prove that a very small objective with poor illumination, was in general use and the makers seem to have striven to produce a small, portable and compact instrument, that could be taken into the field. The improvement of the objectives and the substage illumination did not come till about 1830 and it was not till Schimper's *Bryologia Europæa* was issued a few years later that many species and even genera, in their modern sense, were recognized.

Furthermore the word "*type*" in the sense in which it is here used, meant and still does mean, to many European bryologists, what they consider to be the typical or most common form of a species found in any given locality; and it was not till the Vienna Congress in 1905 adopted the rule for the "*adoption of the oldest specific name*" that it became evident how imperative it is, to find out what the original specimen was to which the name was applied. A critical comparison of specific descriptions will show that various authors had their "personal point of view" and even now it is difficult to coördinate the descriptions of different text-books on mosses. Types of some of the old species still exist in the Herbaria of Dillenius, Linnæus, Hedwig, Swartz, Bridel, etc., but unfortunately the importance of keeping type specimens has not always been understood, and it has often happened that even these are mixtures, and the authors have frequently distributed various species under one name!

Methods of preparing and mounting slides also were still in their infancy up to a very recent date! Karl Müller recommended, and used as a handy method for ready comparison, mica slides made by splitting the plates apart and slipping the object in dry! Sullivant used Canada balsam as a preserving medium, which resulted in such dismal failures, as far as delicate structures were concerned, that it is not surprising that very few of his slides were preserved for future generations to study! Even now, the French and English moss-books show very little of the influence of new methods in histological study! Limpricht's Laubmoose is the only one that gives details of the cross-sections of the stem and the leaf and the measurements of cells and spores. To be sure, some students in various European countries have studied cross-sections of the leaves of *Andreæa*, *Grimmia*, *Orthotrichum*, *Leucobryum*[1], *Dicranum*[2] and *Fissidens*[3], and realized their value in taxonomic studies, but it is becoming painfully evident that in many genera of mosses, no accurate knowledge of specific characters can be had without sections of the leaves.

It is also to be remembered that even before this horrible war began, geographical boundaries, linguistic limitations and racial or political antipàthies, have been known to have their influence, even in "*Pure Science*," and that students of Botany are human, and prefer "*the line of least resistance*," sometimes being unable to make long journeys to verify a fact, or were unwilling to write letters, ask questions or exchange specimens with foreign students. The English Channel and the Atlantic Ocean have served as a scientific as well as a political barrier, and some moss-students have been known to be too busy to answer letters; also others who could write English have preferred to answer their letters in German!

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[1] Cardot, Mem. Soc. Sc. Nat. **37**: 84. pl. 1–19. 1900.

[2] Limpricht Laubmoose, **1**: 333–378. 1886.

[3] E. S. Salmon, Ann. Bot. **13**: 103–130. pl. 5–7. 1899.

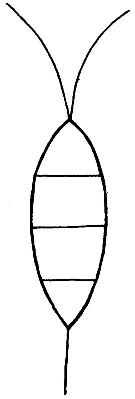
Such are some of the difficulties to be encountered in any search after the truth, and monographic work of any genus will be found both difficult and puzzling. If Hedwig's types at Geneva could be studied by some competent bryologist in the way that Monsieur Cardot[4] studied the North American types, it would probably result in a few changes in some species and genera, and we hope that this may be done soon without any animosities or sarcastic criticisms of those who are endeavoring to find out the facts. The truth cannot be determined without consulting the older authors and herbaria and endeavoring to understand what their limitations were both as to apparatus and collections. I propose in subsequent articles, by reproducing the original descriptions, illustrations and criticisms to show how much we still need the benevolent services of some European bryologist, who will take the time and means to determine what the originals were of some of the older species of *Fissidens*.

NEW YORK BOTANICAL GARDEN.

FUNGUS-SPORES IN A MOSS-CAPSULE

ELIZABETH M. DUNHAM

While examining some mosses collected at Miami, Florida, by Mrs. F. E. Lowe of Worcester, Mass., we found one capsule of *Funaria hygrometrica* var. *patula* Br. & Sch. containing four-celled ciliated bodies in place of the usual moss-spores. These were identified by Dr. Roland Thaxter of Harvard College as the spores of a species of *Pestalozzia*, a genus of the imperfect fungi. This group of fungi may represent special stages in the life cycles of other fungi, since little is known of them at present except the spore-stage. *Pestalozzia* is readily distinguished by the peculiar conidia or spores which are borne on rather short stalks and are spindle-shaped, divided into four parts. The apical and basal cells are hyaline and the central ones dark. The apical cell is provided with one or more filiform appendages. *Pestalozzia* is one of the leaf-blights and the conidia are produced usually beneath the epidermis.



Pestalozzia Spore (Magnified)

Mrs. Elizabeth G. Britton states that fungi often find a moss-capsule a moist, favorable host and fill the spore-sac to the exclusion of the moss-spores, especially in moist warm regions; and that the principal factors in their development seem to be moisture, heat, and the persistency of the capsule. As *Funaria hygrometrica* is an annual species and the capsule lasts but a short time, the occurrence of fungi on this moss is unusual. Mrs. Britton once examined the very rare capsules

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[4] Bull. Hb. Boiss. **7**: 300–380. 1899.